



Partnerships For Innovation: Accelerating Innovation Research- Technology Translation

PFI:AIR-TT
(Solicitation NSF 15-570)

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Good Afternoon and thank you for taking the time to attend today's webinar. Today we will be talking about the Partnerships for Innovation: Accelerating Innovation Research _Technology Translation Program, Solicitation NSF 15-570. My name is Barbara Kenny, I am the program director for this program, and I will be conducting the webinar today.





Welcome and Introduction

- ▶ Structure of webinar (2-3pm)
 - PFI:AIR-TT briefing (20-30 min)
 - Followed by Q&A
 - Operator assisted
- ▶ Website for this webinar and more information about the PFI:AIR-TT program:
<http://www.nsf.gov/eng/iip/pfi/air-tt.jsp>
- ▶ Questions? bkenny@nsf.gov

Industrial Innovation and
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Here's a brief outline of today's webinar. There will be two portions— first I will make a presentation that should take about 20-25 minutes, then the floor will be open for questions. We have an operator assisting us this afternoon and s/he will help with queuing the questions. Please hold your questions until the presentation is completed. I've reserved an hour for the presentation and Q&A.

The website for the PFI:AIR-TT Solicitation is shown on the slide, along with the website for this program. The presentation this afternoon is a summary of the solicitation and I would encourage you to review the actual solicitation for additional details. If you have other questions after the webinar, or have trouble connecting, please email me at bkenny@nsf.gov

 <h1>Big Picture: NSF Goals</h1> 			
Strategic Goals	Transform the Frontiers of Science and Engineering	Stimulate Innovation and Address Societal Needs	Excel as a Federal Science Agency
Objectives	<ul style="list-style-type: none"> Invest in fundamental research to ensure significant continuing advances across science, engineering, and education. Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities. Provide world-class research infrastructure to enable major scientific advances. 	<ul style="list-style-type: none"> Strengthen the links between fundamental research and societal needs through investments and partnerships. Build the capacity of the Nation to address societal challenges using a suite of formal, informal, and broadly available STEM educational mechanisms. 	<ul style="list-style-type: none"> Build an increasingly diverse, engaged, and high-performing workforce by fostering excellence in recruitment, training, leadership, and management of human capital. Use effective methods and innovative solutions to achieve excellence in accomplishing the agency's mission.
<div>Industrial Innovation and Partnerships</div> <div>3</div>			

I always like to start with the big picture to present the context of the program. This is a summary from the current NSF Strategic Plan. In particular, the PFI:AIR program is aligned with the second strategic goal of stimulating innovation and strengthening the links between fundamental research and societal needs. Organizationally, the Division of Innovation and Partnerships, IIP, within the Engineering Directorate, has primary responsibility for this portion of NSF's mission.



Division of Industrial Innovation and Partnerships (IIP)

- ▶ Responsible for the agency's commercialization and innovation efforts.
 - SBIR/STTR Program (<http://www.nsf.gov/eng/iip/sbir/home.jsp>)
 - Academic programs
 - PFI:AIR (<http://www.nsf.gov/eng/iip/pfi/air-tt.jsp>)
 - I/UCRC (<http://www.nsf.gov/eng/iip/iucrc/index.jsp>)
 - PFI:BIC (<http://www.nsf.gov/eng/iip/pfi/bic.jsp>)
 - GOALI (<http://www.nsf.gov/pubs/2012/nsf12513/nsf12513.htm>)
 - I-Corps (http://www.nsf.gov/news/special_reports/i-corps/)

Industrial Innovation and
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The Division of Industrial Innovation and Partnerships, or IIP, has several programs related to promoting innovation and translating research discoveries to societal use and benefit. The predominant one, with 80% of our budget, is the SBIR/STTR program. However, the Division also has an Academic side with five programs aimed at faculty researchers to promote innovation and technology translation. I've listed the websites as reference so you can have a look at the other programs after this webinar.

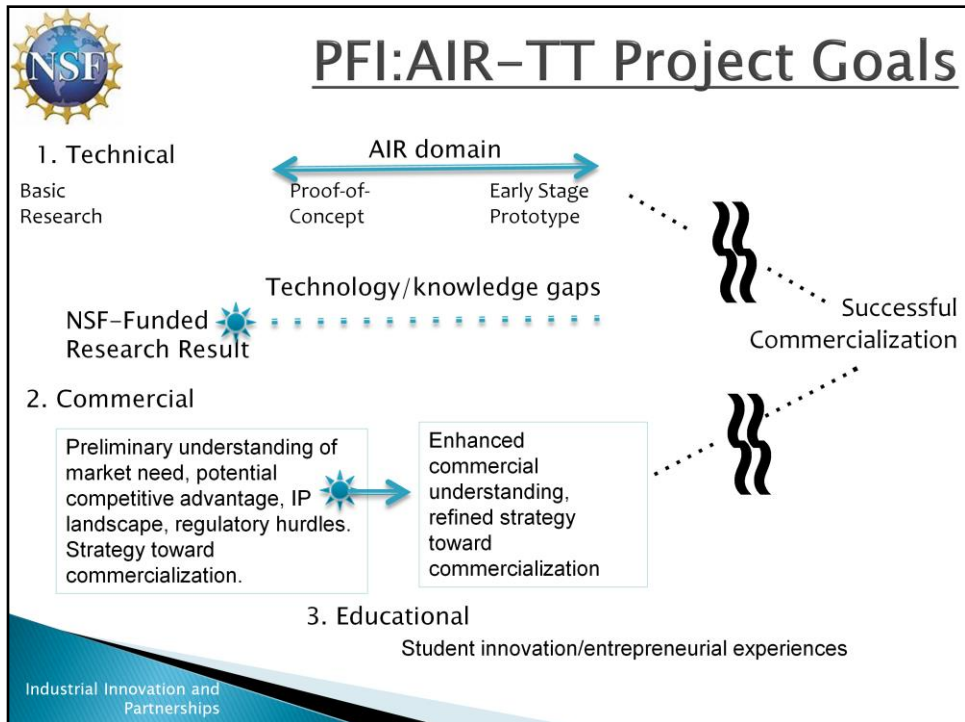


PFI: Accelerating Innovation Research–Technology Translation (AIR–TT)

- ▶ **Program Goal:** Accelerate the derivation of societal and economic benefit from new knowledge created in the discovery process.
- ▶ Opportunity for academic researchers to accelerate NSF-funded research results toward commercialization
 - Within academic environment
- ▶ Develops innovation and entrepreneurship experience and knowledge for faculty and students
- ▶ Creates partnerships
- ▶ Established 2010

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The PFI:AIR program began in 2010 in response to a desire to speed up the translation of the discoveries and results from our NSF investments in basic research and science to commercial application and use. It is an opportunity for academic researchers to perform the additional, focused research necessary to move their initial research results toward an identified commercial application, without having to first start a company. It also offers an opportunity to add breadth to the education of the participating students in terms of business knowledge and to experience the steps necessary to translate technology from research to use.



Along the innovation spectrum from basic research to successful commercial deployment

In this space of translational research you want to move the research result forward toward commercialization. How far forward depends on where you started and what the gaps to be addressed are. In addition, you also want to make some progress on the commercialization side.

Quoted from the solicitation:

A well-constructed PFI: AIR-TT proposal should convey how the project will accomplish the following goals:

1. Technical – Advancement of the state of knowledge of the underlying research discovery toward commercial application via:

A proof-of-concept development, demonstration and evaluation with results sufficient to determine applicability of the innovation to the identified market application/opportunity; OR

A prototype/ scale-up development, demonstration and evaluation, with results sufficient to determine initial feasibility and functional limitations of the innovation in the identified market application/opportunity.

2. Commercial – Although the predominance of effort is expected to be in the achievement of the technical goals, progress on the market/commercial side is

also expected. The individual(s) with business experience should lead this effort. Types of issues that may be considered include: the identified market space, the market need, the competitive technologies; the potential impact of the proposed competitive innovation/substitution technology; necessary intellectual property protection, licensing opportunities and freedom to operate issues; and/or environmental health, safety, and/or other regulatory issues.

3. Educational – Participants in this effort should demonstrate an enhanced understanding of innovation, technology commercialization and/or entrepreneurship by the end of the project.



PFI:AIR-TT Project Goals

► Technical

Advancement of the state of knowledge of the underlying research discovery toward commercial application via:

- A Proof-of-Concept development, demonstration and evaluation with results sufficient to determine applicability of the innovation to the identified market application/opportunity.

–OR–

- A Prototype / scale-up development, demonstration and evaluation, with results sufficient to determine initial feasibility and functional limitations of the innovation in the identified market application/opportunity.

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Stating in words what the previous chart tried to convey visually, quoted from the solicitation.

As I said on the innovation spectrum chart, the goal is that the technologies supported by PFI:AIR awards will be further to the right, further along the innovation spectrum, at the end of the award than they were at the beginning. Thus the PFI:AIR-TT solicitation offers a funding opportunity to conduct translational research to develop a proof-of-concept, or prototype or scale-up based on fundamental research results under a previous or concurrent NSF-grant. An additional goal is to offer students and post-docs the opportunity to gain more exposure to and training in innovation than they would under a typical Ph.D. program.



PFI:AIR-TT Project Goals

► **Commercial**

- Predominance of effort is expected to be in the achievement of the technical goals; however, progress should be made in one or more of the following areas:
 - Understanding potential market need, competing technologies, and impact of proposed innovation.
 - Understanding necessary intellectual property protection and freedom to operate issues.
 - Understanding relevant regulatory issues.
- The individual(s) with business experience should lead this effort.

► **Educational**

- Participants should demonstrate an enhanced knowledge of innovation, technology commercialization and/or entrepreneurship by the end of the award.



PFI: AIR–TT or SBIR/STTR?

- ▶ Do you have a prior NSF award upon which the project is based?
- ▶ Do you have a company?
- ▶ Do you need flexibility in partnerships?
- ▶ Do you need more time under the university umbrella to develop the technology?
- ▶ Do you plan to license the technology to an existing company or spin out a new small business?
- ▶ Status/interests of the key personnel—PhD candidate? Post-doc?
- ▶ SBIR/STTR has opportunity for Phase II (\$750K), additional matching funds for third party investments, and access to business development consultants.

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-I often get the question, Should I apply for SBIR/STTR, or AIR? So I put together this chart to address some of the considerations.

-First of all, if you do not have a prior NSF award, you are not eligible for AIR so your only route is SBIR/STTR.

-Second, if you don't have a company, you are not eligible for SBIR/STTR (as the lead), so AIR may be the better choice.

-AIR offers more flexibility in partnership arrangements by allowing university-university collaboration and not specifying mandatory percentages (as in the case of STTR) for sub awards (outside of the maximum of 50%)

-You may find it advantageous to take advantage of university facilities, assistance, and students rather than to launch an independent spin off company at this point. You may want to consider licensing options rather than developing the technology through a small business, or maybe you just haven't decided yet and need more time to decide the best route while still making progress on advancing the technology

-You may have a promising PhD student who would be an excellent entrepreneur but isn't quite ready yet to start the company. Or you may not have anyone who has the energy, drive, passion and commitment to put into a start up company.

SBIR/STTR is an excellent program if it is a good fit. There is a possibility of a Phase II award, there are opportunities for matching award supplements based on attracting third party investment, and there is access to business consultants and mentoring.

Highly suggest contacting relevant program director first for feedback if possible before submitting an application.



Key Facts 15-570

► Four windows

LOI required	Full Proposal
September 8, 2015	October 9, 2015
March 1, 2016	April 1, 2016
September 8, 2016	October 11, 2016
March 1, 2017	April 3, 2017

► PI/co-PI requirements:

- PI must be faculty member at U.S. academic / research institution
- At least one (non-PI) individual involved in the work (e.g. co-PI, Senior Personnel, Other Professional, Consultant, Collaborator, Sub-Awardee, etc.) must have explicit business experience.
- PI may submit only one proposal per submission window.
- PI may submit to consecutive submission windows.*
- Co-PI may participate on more than one per submission window.*



Key Facts–Lineage

- ▶ PI or co-PI must have had **an NSF award*** that *ended* no more than 6-years prior to the full proposal deadline date.
 - The proposed proof-of-concept or prototype must be derived from the research results and/or discoveries from this underlying NSF award.
 - It is incumbent upon the PI to describe the link between the research results from the lineage NSF award and the proposed work.
 - *Sole* lineage to any of the following programs NOT allowed.
 - REU, RET, GRFP, PFI:AIR-TT, PFI:AIR-RA, I-Corps, SBIR/STTR.
 - Submit a supplemental document with name, award number, **intellectual merit, broader impacts and publications from the claimed lineage award(s).***

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*Change from 14-569

In the last solicitation we specified “NSF Research Award” and there was confusion and a lot of gray lines about what exactly constituted an NSF Research Award. So we have relaxed the language but not the intent that the work proposed be derived from the research results or discoveries from (enabled by) a prior NSF award. Then it is incumbent upon the PI to make that case and describe how the prior NSF award and associated research results underpin this new effort to translate the technology.

We are asking for more information about the lineage award(s) to be submitted as a supplement document, including intellectual merit, broader impacts, and publications. This does not need to be covered in the project description portion of the proposal but rather submitted as a supplemental document.



Key Facts: Budget

- ▶ Up to \$200K for up to 18 months
- ▶ Up to 50% sub-award is allowed (not required) in order to augment capabilities of the submitting institution
 - If sub-award is to foreign entity, clearly justify the need.
 - Not intended to support large corporations' research and development activities.
 - Cooperative Research Agreement (CRA) (e.g. university-industry) or Memorandum of Understanding (MOU) (e.g. university-university) required upon notification of award, prior to release of funds.
 - CRA/MOU intended to cover terms of intellectual property and publication rights between partners.
 - Letter in the supplementary documents stating that the submitting institution will submit the signed CRA/MOU prior to NSF release of funds.

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Cooperative Research Agreement, I often get questions on this. This is an agreement that covers intellectual property and publication issues between the proposing institution and any partners or sub awardees where there might be issues of joint development of intellectual property. NSF is trying to ensure that the partners have discussed these issues and have come up with an agreement on how to handle them prior to the issuance of our award.



Key Facts: Project Narrative* (1)

► **Overview and Motivation** (1-2 pgs)

- What is your innovation, and why would anyone want to buy it? How is it derived from prior NSF support? What is the output of the award (proof-of-concept or prototype)? What are the technology gaps to be addressed? What is the intellectual merit?

► **Market Opportunity and Intellectual Property** (3-4 pgs)

- Describe the broader impacts in terms of societal, economic or commercial benefit. Discuss the results of preliminary market research. What are the market needs and what makes the innovation competitive? What is the status of the intellectual property?

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*Note: Solicitation guidelines take
precedence over GPG.

Note that the guidance in the solicitation sometimes differs from what is stated in the Grants and Proposal Guidelines, GPG, that covers the unsolicited proposals that you may be familiar with submitting to particular NSF programs. The guidance in the solicitation takes precedence over the GPG where there are differences.

The page suggestions are just that, suggestions. You should write the proposal to cover this requested information in a way that is clear, makes sense, and best describes what you are proposing to do and why it is important. In some cases it may be more important to spend more pages on one particular section than it would be in another technology area. These guidelines should be tailored to make the best case possible for what you are proposing.



Key Facts: Project Narrative (2)

- ▶ **Technical Challenges and Research Plan** (5-7 pages)
 - What is the current state of the art, and what are the technology gaps to be overcome? What is the research plan to address the identified gaps? Discuss the project plan.
- ▶ **Team** (1-2 pages)
 - Describe the team members *and their roles/value added* to the project. Identify the person with the business experience and how they will help achieve the goals of the project.
- ▶ **Strategy toward Commercialization** (1-2 pages)
 - Describe the overall strategy of a path toward commercialization.
- ▶ **Training and Involvement of Students** (1-2 pages)
 - How will the students gain knowledge of innovation and technology commercialization beyond the usual research experience? How will the work help develop a diverse and globally competitive workforce?

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A comment on the team description— we are interested in the roles of the team members, e.g. what will they do for the team, how will they help, why is their role important, etc., in addition to any key qualifications. Since the biosketches are included as supplementary documents, its not necessary to completely restate all of that information.



Key Facts: Supplemental Documents

- ▶ **Milestone Chart** with specific tasks and deliverables
- ▶ **List of Prior NSF Awards** with lineage to proposed work
 - Include Intellectual Merit, Broader Impacts, and Publications
- ▶ **Letters of Support**
 - *Encouraged*, but not required. Maximum of three.
- ▶ **Data Management Plan**
- ▶ ***If Applicable***
 - Letters of Collaboration
 - Letter of Cooperative Research Agreement
 - Postdoctoral Research Mentoring plan
 - Letters regarding use of human or animal subjects

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A comment on Letters of Support, these are usually helpful to the proposal, particularly if the PI is making the argument for a need for a particular product and this can be corroborated by the letters of support.



Additional Review Criteria

- ▶ Strength of discussion of market need and how the innovation has competitive potential.
- ▶ Merit of the research plan to translate the existing research discovery to proof-of-concept or prototype.
 - Demonstrated understanding of technology/knowledge gaps.
- ▶ Lineage of the proposed work to prior NSF award.
- ▶ Suitability of proposed team to successfully complete the proposed work.
- ▶ Quality of the preliminary patent search and discussion
- ▶ Quality of strategy for a path toward commercialization.
- ▶ Quality of plan for involvement of students:
 - Discussion of how proposed effort will enhance knowledge of innovation.

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Please take the time to read the entire solicitation, these slides are summaries of the main points but all of this is spelled out in the solicitation.



Post-Award (Planned)

- ▶ Presentation of a Technology Translation plan via webinar format to NSF Program Officer staff between 12-18 months after award.
- ▶ Attendance at a Technology Showcase event with an opportunity to demonstrate a prototype and/or present a poster to attendees who may include potential industry partners or investors.
 - Include travel budget for PI and one student/post-doc to attend.

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A few words on post-award activities— there are two things planned. One is about an hour webinar between the PI/students and the NSF program directors to get feedback on possible commercialization directions and plans. The other is an opportunity to attend a grantee meeting or showcase that is focused on technology translation and innovation, such as joining in with the NSF SBIR/STTR Phase II Grantee meeting.



Tips

▶ Panels

- Tend to be relatively broad— proposals grouped by general technology area.

▶ Reviewers

- Mix of faculty and those employed by industry with advanced technical degrees and expertise.
- Most have experience as SBIR/STTR program reviewers.

▶ Types of questions reviewers ask:

- Is there a market opportunity here?
- How well does the proposer understand the intended market, potential competitors, and his/her innovation's advantage in the market place?
- What is the technology, and is there evidence that supports the technical basis of the proposed innovation?
- What is the status of the Intellectual Property, and is there Freedom to Operate?
- Are the research issues to be addressed worthy of NSF support?

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“Worthy” -- Work may not necessarily be “novel” or “transformative” because that occurred on the prior NSF grant. But should be intellectually non-trivial (should advance knowledge) and important with respect to commercialization (i.e., work worth approx.. \$200k of NSF funding).

“There should be new knowledge at the end of the award that has moved the technology closer toward commercialization.” (from the solicitation)



Thank you for your interest in the PFI:AIR-Technology Translation program. A copy of the webinar will be available at

<http://www.nsf.gov/eng/iip/pfi/air-tt.jsp>

Additional questions, please contact Barbara Kenny at bkenny@nsf.gov

Questions?

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